**TEST Tear Film Break-Up (TFBUT) also called: BUT (Break-up Time) and FBUT (Fluorescein Break-Up Time)**

**TO DIAGNOSE Tear Film Stability**

**VERSION of TEST**

**DESCRIPTION**

The tear film break-up time is defined as the interval between the last complete blink and the first appearance of a dry spot, or disruption in the tear film.

**CONDUCT of TEST [V1]**

1. Instill 1 to 5 micro-liters of non-preserved, 2% sodium fluorescein onto the bulbar conjunctiva without inducing reflex tearing by using a micro-pipette or D.E.T. strip;
2. The patient is instructed to blink naturally, without squeezing, several times to distribute the fluorescein;
3. Within 10 - 30 seconds of the fluorescein instillation, the patient is asked to stare straight ahead without blinking, until told otherwise;
4. Set slit-lamp magnification at 10X, keep the background illumination intensity constant (cobalt blue light) and use a Wratten #12 yellow filter to enhance observation of the tear film over the entire cornea;
5. Use stopwatch to record time between last complete blink and first appearance of growing micelle;
6. Once TFBUT is observed, instruct patient to blink freely.

**CONDUCT of TEST [V2]**

2.5 µl 1.0% fluorescein

* A slit-lamp, on-line video camera may be used to capture TFBUT. Video capture with an on-screen timer allows for precise measurement of the time between the last complete blink and the appearance of the first, growing micelle. This also allows masking for clinical trials purposes.

**Materials:**

- Non-preserved, 2% sodium fluorescein;
- Micro-pipette;
- Or D.E.T. strip.
- Slit-lamp
- Timer

**Variations of technique**

Historically, the technique for evaluating TFBUT has lacked consistency. Large and varying amounts of sodium fluorescein (up to 50 µl) were used, times were determined by counting aloud and using less sophisticated instrumentation. Such techniques yield varying results.

**Standardization**


- Patient instruction;
- Slit-lamp magnification;
- Barrier filter.

**Diagnostic value**

This version (micro-quantities of fluorescein): Lemp 1995

Abelson et al.
TFBUT ≤ 5 seconds = dry eye; 
TFBUT > 5 seconds = normal.

Other version (larger quantities of fluorescein):

TFBUT ≤ 10 seconds = dry eye; 
TFBUT > 10 seconds = normal.

Repeatability

| Intra-observer agreement. | [ ] |
| Inter-observer agreement. | [ ] |

Sensitivity

(true positives) [72.2] 184/255 patients cut off < 10 sec 

Vitale et al. 1994 European Criteria See 'Combined' template

Specificity

(100 – false positives) [61.6] 69/112 controls

Other Stats

Test problems

Instillation of fluorescein must be done carefully so that reflex tearing is not induced. Alterations in tear volume may artificially lengthen TFBUT.

Proper patient instruction is critical. If patients are not told to blink freely after TFBUT occurs, reflex tearing may occur and skew subsequent measurements.

Large, uncontrolled volumes of fluorescein may also artificially lengthen TFBUT.

Test solutions

Implement techniques listed in conduct of test section.

FORWARD

Glossary

TFBUT = Tear film break-up time; BUT = Break-Up Time ) and FBUT = Fluorescein Break-Up Time.

References


Marquardt R, Stotmeiser R, Christ T. Modification of tear film break-up time test for increased reliability, in Holly FJ, ed. The Preocular Tear Film in Health, Disease and Contact Lens Wear. Lubbock, Texas: Dry Eye Institute, 1986:57-63.

Welch D, Ousler G. An approach to a more standardized method of evaluating tear film break-up time. IOVS 2003; 2485/B324.